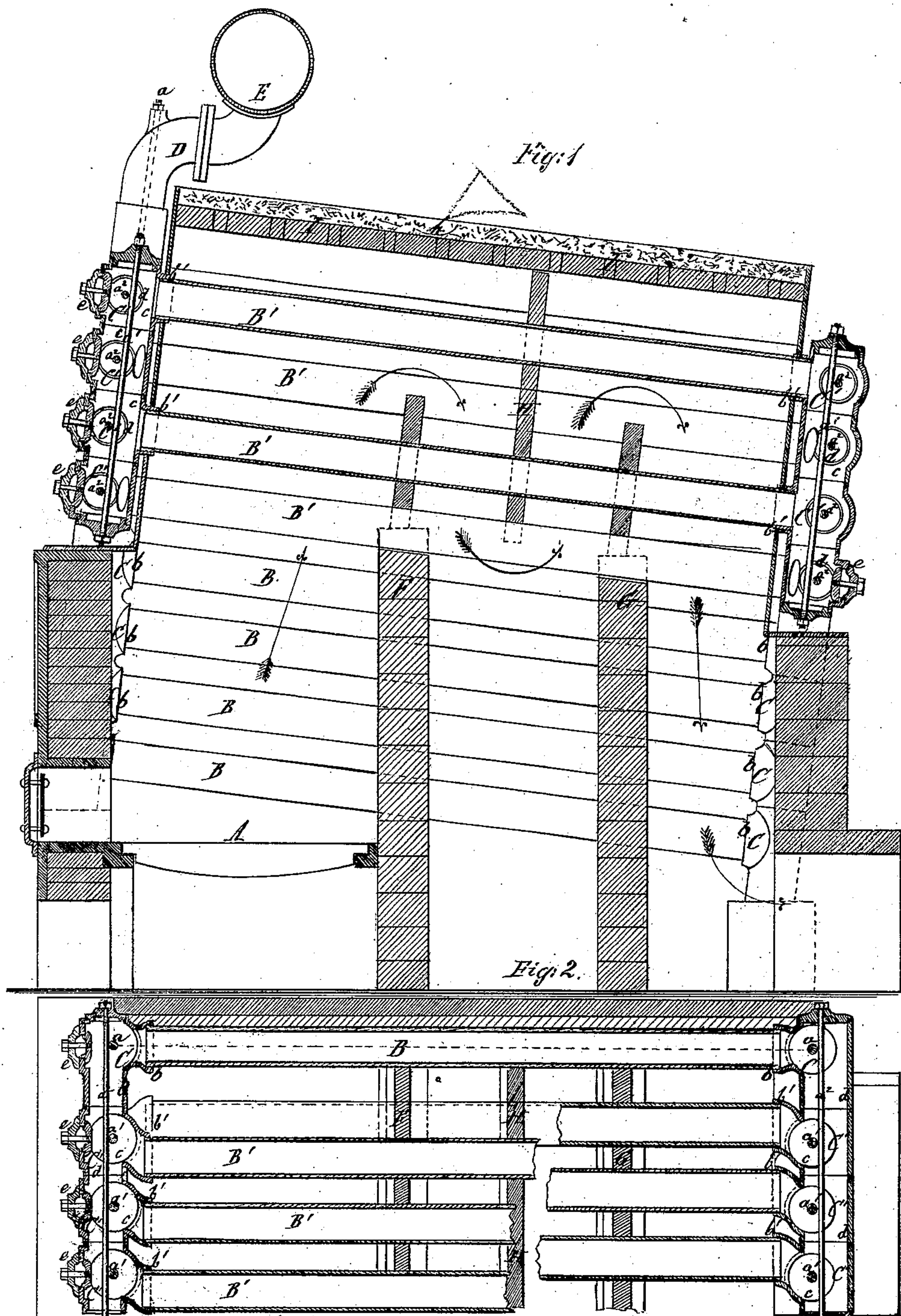


J. GRIFFITH, G. W. WUNDRAM & T. H. MULLER.

Steam Generator.

No. 98,490.

Patented Jan. 4, 1870.



Witnesses.
E. F. Kastenhuber
C. Mahler

John Griffith, G. W. Wundram, T. H. Muller
Per Subscribed, Haulf attw.

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Fig. 3

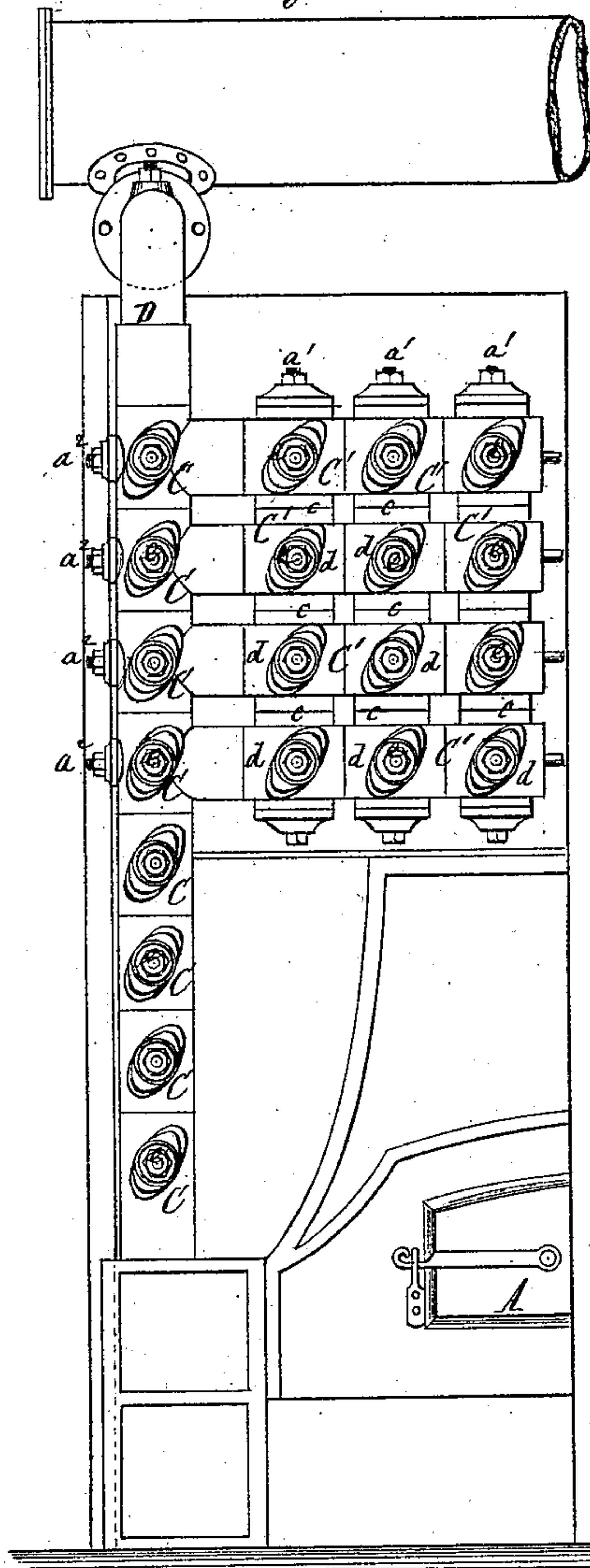
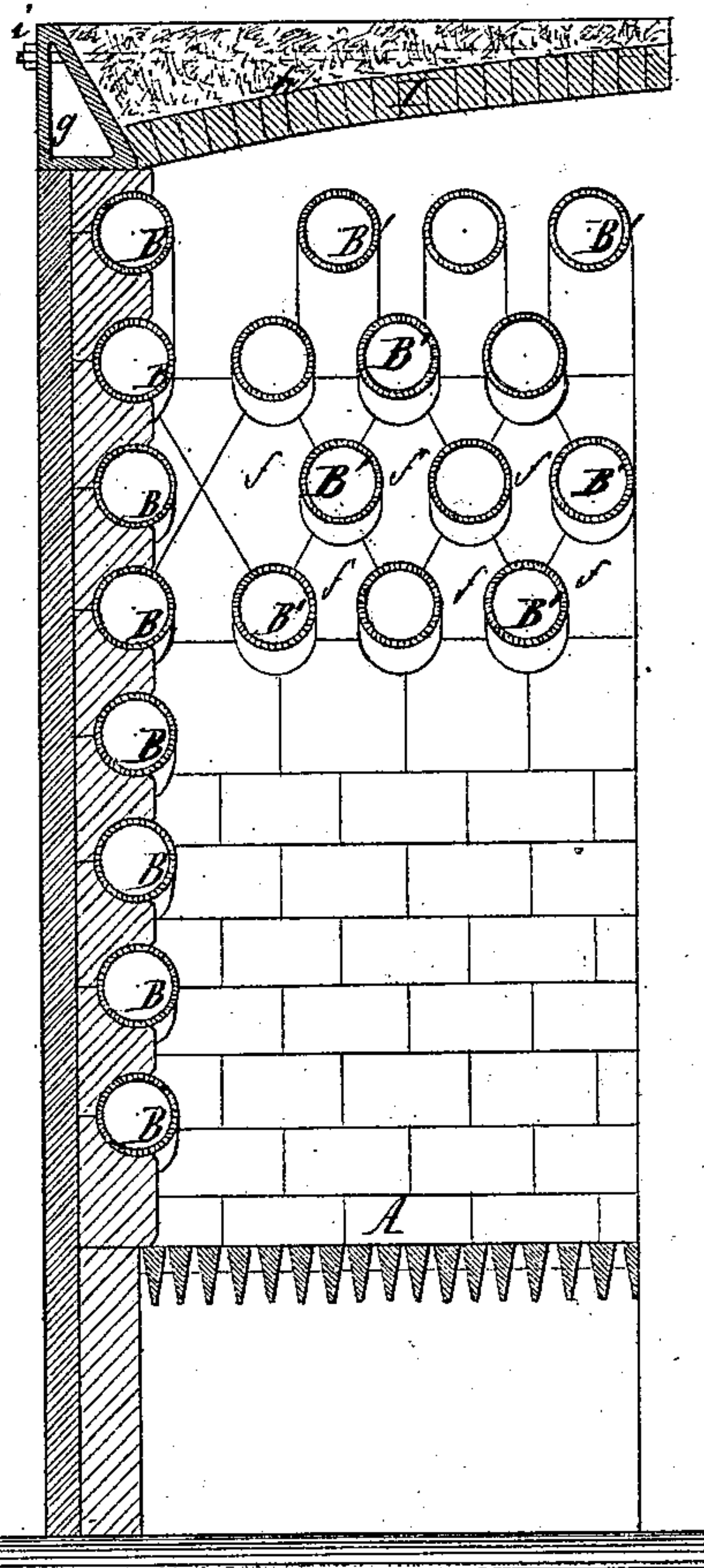


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN GRIFFITH, GEORGE W. WUNDRAM, AND T. H. MÜLLER, OF NEW YORK,
N. Y.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. 98,430, dated January 4, 1870.

To all whom it may concern:

Be it known that we, JOHN GRIFFITH, GEORGE W. WUNDRAM, and T. H. MÜLLER, all of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Boilers; and we do hereby declare this to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which drawings—

Figure 1 represents a longitudinal vertical section of this invention. Fig. 2 is a horizontal section of the same. Fig. 3 is an end view of the same. Fig. 4 is a transverse vertical section of the same.

Similar letters indicate corresponding parts.

This invention relates to a sectional boiler which is provided with a set of pipes situated on the sides of the fire-place, whereby the effective heating-surface of the boiler is materially increased, and the circulation of the water is improved. The pipes which form the main body of the boiler are "staggered" and united by heads which are not staggered, but set in uniform rows, one above the other, each head being so constructed that it forms a tight joint with the adjoining heads above, below, and on its sides. To the upper head, on each side of the boiler, is secured a tubular bracket, which is fastened down by the same bolt that passes through the heads, and which serves to carry off the steam, either into a drum provided for the purpose of containing the same, or directly to the engine or other place where the same is used. With the water-pipes are combined two or more bridge-walls and one or more intermediate partition-walls, in such a manner that the fire is compelled to pass up and down between said pipes in a zigzag course, and that all the parts of each pipe are as near as possible heated to a uniform temperature. The bricks forming the bridge-walls and the inner portion of the side walls are provided with semi-cylindrical indentations or cavities to receive the several pipes, between which said bricks are fitted in such a manner that the construction of said walls is materially facilitated, and that the walls can be built close enough to the surface of the pipes to intercept the passage of the heated gases. The top of the wall inclosing our boiler is composed of brick and of two triangular shoes, one on each side, said shoes being pressed up

against the intervening brick-work by means of screw-bolts, and placed loosely on the top of the side walls, so that the expansion and contraction of the top will have no injurious effect on the side walls. In practice the top is made in sections, so that each section can be readily taken off and replaced.

In the drawings, the letter A designates the furnace or fire-place of our steam-boiler, said fire-place being built into brick-work in the usual manner. On each side of this fire-place are situated a series of pipes, B, which connect with each other by means of heads C. These heads are placed one above the other, so that they form an inclined column, being held together by screw-bolts *a*, which pass through said heads, as shown in Fig. 1 of the drawings. Each of the heads C is provided with a socket, *b*, to receive the pipes B, which are built into the brick-work, forming supports for the bricks *c*, which are provided with segmental indentations or cavities to receive said pipes, as shown in Fig. 4, and the center lines of the sockets *b* are situated in a plane passing in a vertical direction through the centers of the heads C, so that the pipes B are situated in a regular row, one above the other. By forming the bricks so as to fit over a portion of the pipes the operation of repairing the side walls is materially facilitated, since by simply drawing the pipes above and below a course of said bricks a little apart the bricks can be withdrawn or introduced from the outside.

The body of the boiler is composed of a series of pipes, B', which are connected to each other by means of heads C', each of these heads being made in the shape of a cross, and provided with sockets *b'* to receive the pipes. These sockets, unlike the sockets of the heads C of the side pipes, B, are situated on the sides of the vertical planes passing through the centers of the heads, so that the pipes B', instead of forming regular rows, are staggered, each pipe being situated opposite the space between the two pipes above or below. (Best seen in Fig. 4.) The upright shanks *c* of the heads C are not situated in the same planes with the horizontal shanks *d*, so that room is obtained for bolts *a'* *a''*, which serve to unite said heads both in a horizontal and in a vertical direction, and the heads C of the side pipes, which are in line with the heads C' of the body-pipes, are also provided with horizontal shanks corresponding

in position to the horizontal shanks of the body-heads C', so that said body-heads C' can be firmly drawn up against the side heads by means of the horizontal bolts a^2 . Each of the heads C and C' is also provided with a hand-hole, e , so that by removing the covers of these hand-holes easy access can be had to the pipes for the purpose of cleaning. By this arrangement of the heads C C' all the parts of the boiler can be readily and firmly connected without interrupting the free circulation of the water throughout the whole boiler.

From the upper side heads rise the curved pipes or brackets D, which are so constructed that they can be fastened down to the heads by means of the bolts a , which also serve to secure said heads together, and these curved pipes serve to carry off the steam, either into a drum, E, or directly to the engine or other place where such steam is to be used.

The open spaces between the heads C C' are closed by suitable plates or plugs, which may be put in loosely or fastened in any desirable manner.

Under the body of the boiler are built two or more bridge-walls, F G, which extend up between the pipes B' to the row of pipes next below the top row, as shown in Fig. 1, and between these bridge-walls is a partition-wall, H, built up between the pipes B' and extending clear up to the top of the brick-work inclosing the boiler. This partition-wall and those parts of the bridge-walls which extend up between the pipes are made of bricks f , which are provided each with three or four segmental indentations to admit the pipes, (see Fig. 4,) and by this formation of the bricks the construction of these walls is materially facilitated, and said walls can be easily built up so as to hook the pipes as close as may be desirable. By the combination of the partition-walls H with the bridge-walls F G, extending partially up between the pipes, the fire is compelled to pass through between said pipes in a zigzag course, and all the parts of said pipes

are heated as near as possible to a uniform temperature.

The top I of the brick wall in which our boiler is set is constructed of two shoes, g , made of cast-iron, or any other suitable material, with inclined sides which form the support for the intermediate brick-work or arch, h , said shoes being pressed up against the arch by screw-bolts i . In practice the top will be made in sections, so that each section can be readily taken off or replaced. The shoes g are placed loosely on the top of the side walls, so that said top can freely expand or contract without injuring the side walls. If desired, however, the arch of the top may be supported by metal girders extending clear across the brick-work in place of the shoes g .

We do not wish to claim in this present application anything shown and described in Letters Patent granted to T. H. Müller, October 27, 1868.

What we claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the pipes B along the sides of the fire-chamber, in the manner shown, so that said pipes shall be partially embedded in and form a support for the bricks, and that the bricks may be readily renewed for the purpose of repair, substantially as set forth.

2. The heads C', provided with vertical and horizontal shanks, and with sockets so arranged that while the heads are set in uniform rows one above another the sockets, and consequently the tubes, are staggered, substantially as shown and described.

3. The bricks provided with indentations on two or more sides, in combination with the pipes B and B', substantially as described.

4. The shoes g , in combination with the arch h of the top I, substantially as set forth.

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Witnesses:

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